February 21, 2020

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, DC 20554

Re: **Notice of Ex Parte Meeting**
Expanding Flexible Use of the 3.7 to 4.2 GHz Band
GN Docket No. 18-122

Dear Ms. Dortch,

This letter provides notice to the Federal Communications Commission ("FCC" or "Commission") under Rule 1.1206,[1] that on February 19, 2020, Bruno Fromont, Senior Vice President, Strategy and Asset Management; Hazem Moakkit, Vice President, Spectrum Strategy; Tom McNamara, Vice President, Program Management; and Susan Crandall, Associate General Counsel, all of Intelsat US LLC, met with the FCC staff listed in Attachment A hereto.

Having reviewed the FCC's recently released Draft Order in the above referenced C-band proceeding,[2] the Intelsat representatives raised a number of concerns with certain technical and operational aspects of the document. Specifically, as discussed more fully below, the Intelsat representatives provided the FCC with its views that the Draft Order's 1) denial of access to all 500 MHz of C-band post-clearing at four TT&C/gateway sites would result in the loss of critical incumbent services received in the contiguous United States from ocean-region satellites; 2) proposed technical rules would fail to adequately protect critical Telemetry, Tracking and Control ("TT&C") operations; and 3) proposed out-of-band emission ("OBE") and in-band emission ("IBE") levels likely would result in Fixed-Satellite Service ("FSS") operations receiving harmful interference from Flexible Use operations post-clearing. Each of these individually pose serious practical and technical feasibility problems and must be carefully and thoughtfully addressed in any final FCC order addressing repurposing of C-band spectrum.

I. Service Continuity Requires FSS Access to the Full 3700-4200 MHz at Four TT&C/ Gateway Sites

The C-Band Alliance ("CBA") proposal for clearing 300 MHz was predicated on the fact that non-CONUS satellites that provide C-band downlinks in the U.S. would continue to provide these downlinks into the four designated TT&C/gateway locations.[3] Intelsat alone operates twelve C-band satellites in the Atlantic Ocean Region (AOR) and three C-band satellites in the Pacific

[1] 47 C.F.R. § 1.1206.
[2] Expanding Flexible Use of the 3.7-4.2 GHz Band, Draft Report and Order and Order of Proposed Modification, GN Docket No. 18-122, FCC-CIRC2002-01 (rel. Feb. 7, 2020) ("Draft Order").
[3] Comments of the C-Band Alliance, GN Docket No. 18-122 (Aug. 7, 2019) at 29-30.

Ocean Region (POR). These satellites all provide downlinked services, including broadcast programming generated abroad for distribution to the contiguous United States, albeit to a smaller number of earth stations. In order to ensure service continuity to the U.S.-bound services on these satellites, Intelsat assumed that all the downlink earth stations associated with AOR and POR satellites would, per the CBA proposal, be consolidated into the four designated TT&C/gateway locations. That is because grooming and adding additional satellites in the AOR and POR is neither practical nor possible given the high fill rate of these satellites and the unavailability of unused orbital locations.

The Draft Order, however, affords no protection for use of the full 500 MHz at these TT&C/gateway sites and that failure has significant adverse ramifications. Intelsat strongly urges the Commission to allow continued FSS access to the full 3700-4200 MHz band at the four TT&C/gateway locations in order to ensure that the clearing of 300 MHz of C-band in the contiguous United States will not result in significant loss of existing incumbent services currently delivered to customers.

In conjunction with this change, and for the same reasons, Intelsat believes that the Commission should allow FSS operations in the 3700-4000 MHz band at the TT&C/gateway sites on a secondary basis. Such a change would be in the public interest as it would allow for more efficient use of spectrum without posing any harm to future Flexible Use licensees.

II. Lack of Sufficient Protection of TT&C Carriers Could Result in Loss of Control of a Satellite

The criticality of TT&C operations cannot be overstated as it is a matter of safety of space for all satellite operators. The TT&C functions are critical to ensure the satellite performs correctly and include monitoring the health and status of various spacecraft subsystems, determining the satellite's exact location, and maintaining proper control of the satellite through the reception, processing, and implementation of commands transmitted from the ground. As such, the integrity of TT&C operations should not be compromised under any circumstances. It is important to note that telemetry signals inherently have low margin, about 1.7 dB. Erosion of such a narrow margin would create an unacceptable risk to satellite operations and the Commission must take that fact into account. The CBA proposal addressing this point was based on an I/N criterion of -15 dB and on the fact that TT&C/gateway locations would have access to the entire 3700-4200 MHz band such that no bandpass filters would be required.[4] Additionally, the CBA proposed a 150 km coordination distance around TT&C/gateway locations.[5]

Unaccountably, the Draft Order sets forth some technical parameters that cannot withstand review as reasonable and, if not addressed, could severely jeopardize TT&C operations. First, the I/N protection criterion was degraded from -15 dB to -6 dB,[6] which represents an eight-fold increase in noise. Additionally, the Draft Order limits the protection of telemetry carriers to a narrow bandwidth around the telemetry carrier,[7] which would necessitate the addition of narrow bandpass filters that would introduce unacceptable insertion loss which, in turn, would result in negative link

[4] Reply Comments of the C-Band Alliance, GN Docket No. 18-122 (Dec. 7, 2018), Technical Annex at 5 n.14 and at 7.
[5] *Id.* at 7.
[6] Draft Order at ¶ 340.
[7] *Id.* at ¶ 343.

margin.[8] Lastly, the Draft Order also severely restricts the coordination zone from 150 km to 70 km.[9] All of these parameters – particularly when taken in combination -- would severely erode the telemetry link margin and may very well drive it into negative territory. Were that to occur, it would result in an operator losing the ability to control the satellite. Such a result clearly is not in the public interest.

As a way forward, Intelsat proposes that the Commission consider making the following changes to its technical rules. First, at a minimum, the I/N criterion should be lowered to -10dB, and second, the coordination zone should be increased to 100 km, which is still smaller than the 150 km that the CBA originally proposed.

Additionally, if the FCC insists on only protecting telemetry links and not allowing FSS operators full access to the entire 3700-4200 MHz at the four TT&C/gateway sites, then the protected bandwidth around the telemetry signal must be at least 25 MHz from each TT&C band edge. Such a guard band is necessary to ensure that the required passband filters do not add prohibitive insertion losses. Such filters would achieve 60 dB rejection at +/- 25 MHz from the center frequency as called for in the Draft Order.[10] Finally, the 70 dB rejection criterion set forth in the Draft Order must be eliminated because it is simply unachievable under the required insertion loss and group delay performance characteristics.

III. The Proposed OOBE and IBE Levels Will Not Adequately Protect FSS Operations From Harmful Interference Post-Transition

Intelsat also has serious concerns about the adequacy of the proposed rules designed to protect earth stations from interference caused by OOBE and IBE. First, the Draft Order degrades the I/N criterion from -10dB to -6dB,[11] which results in well over a two-fold increase in noise. Additionally, the PFD levels proposed by the FCC in the Draft Order for the protection of earth stations from OOBE and IBE are based on a reference FSS antenna gain of 0 dBi, which corresponds to a 20-degree elevation angle (assuming the transmitting 5G base station and the receive FSS earth station are at the same height).[12] In many parts of the contiguous United States, the look angle of earth stations can be much lower than 20 degrees, which results in a significantly higher gain towards the interferer. For example, an earth station in Boston pointed towards Galaxy 15 (133° W.L.) would have an elevation angle of 11.8° and an earth station in Bangor pointed towards AMC-4 (135° W.L.) would have an elevation angle of 8.1°. All these concerns are likely to result in earth stations being subject to excessive interference caused by Flexible Use operations post-transition.

As a way forward, Intelsat proposes that the FCC change the reference FSS antenna gain to 10 dBi, which corresponds to a 6° elevation angle. This value will ensure that practically all earth stations in CONUS actually would be covered by the PFD limits that are meant to protect them. Thus, the PFD limit for OOBE as measured at the earth station should be adjusted to -134

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[8] The Intelsat representatives noted that such filters have not been designed or tested, nor in any event could they achieve the roll-off specified by FCC's Draft Order at ¶ 346. Because the CBA had assumed protection of all 500 MHz at the four TT&C/gateway sites, there was no need for a filter for the antennas at these sites.
[9] Draft Order at ¶ 345.
[10] *Id.* at ¶ 346.
[11] *Id*. at ¶ 325.
[12] *Id.*

dBW/m^2/MHz. Similarly, the PFD limit for IBE as measured at the earth station antenna should be adjusted to -30 dBW/m^2/MHz. This adjusted IBE value reflects not only an FSS antenna reference gain of 10 dBi, but also includes a 4 dB factor to account for aggregate interference effects. The proposed FCC rules account for such an aggregate interference factor when determining the PFD limit for OOBE but do not apply the same factor when determining PFD limits for IBE, so it was added here for consistency.

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It is critical that the Commission consider these technical and operational concerns as the parameters set forth in the Draft Order collectively present significant risk to satellite safety and to C-band service continuity post-transition. Please contact the undersigned with any questions regarding this letter.

Respectfully submitted,

/s/ Michelle V. Bryan
Michelle V. Bryan
Executive Vice President, General Counsel and Chief Administrative Officer

Susan H. Crandall
Associate General Counsel

Attachment

cc: Matthew Pearl

ATTACHMENT A

International Bureau
Jose Albuquerque
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Office of Engineering and Technology
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